

REMARKS

An Office Action was mailed July 13, 2010. This response is timely. Any fee due with this paper, including any necessary extension fees, may be charged on Deposit Account 50-1290.

Summary

Claims 1-4 were examined. Claim 1 is the only independent claim.

By the foregoing, claim 1 is amended. No new matter has been added.

An Information Disclosure Statement is being filed shortly.

Objections to the Drawings

Figs. 4-8 are objected for failing to include the legend "Prior Art." Replacement sheets are being submitted herewith. Accordingly, the Examiner is respectfully requested to withdraw the objection.

Rejection under 35 U.S.C. §103(a)

Claims 1-3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP 4039412 cited in the Information Disclosure Statement in view of U.S. Patent No. 4,318,574 to Nakamura. Claim 4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP 412, Nakamura and in view of U.S. Patent No. 3,501,210 to Deutsch.

The presently claimed invention now recites that:

the angle of the inside surface of on of the both inward flange portions which has a flexural concave portion formed at a base end section thereof and depressed from an inner peripheral surface of the cylinder portion, with respect to a virtual plane which exists in a direction orthogonal to a central axis of the shell, is larger than the angle of the inside surface of the other inward flange portion on the opposite side which has no flexural concave portion with respect to the virtual plane.

No new matter has been added. Support may be found in Figs. 1 and 2. The claims are also well supported by at least the specification as filed at 9:15 et al. and 18:11 et al. The rejections are respectfully traversed.

While not dispositive, it is worthy to note that another major patent office, the Japan Patent Office, has allowed the claims that are now presented and granted the application as JP 4 457 601.

Prior to addressing the specific rejection, an explanation of the technical aspects of the art may aid in the examination. During manufacturing, a shell which constitutes a shell-type needle roller bearing, one inward flange portion 4b (shown on the left side in Figs. 1 and 2) is formed with a powerful force before needles 2a are built into the inner diameter side of the shell 1c. Thus, the wall thickness of the continuous portion between this inward flange portion 3b and the cylinder portion 3 remains the same as the wall thickness of the other portions.

On the other hand, the other inward flange portion 4c is formed after needles 2a are built into the inner diameter side of the shell 1c. However, great force cannot be used to bend it. Therefore, this inward flange portion 4c is formed by bending a thin-walled section of the shell 1c in a direction toward the inner diameter side. A flexural concave portion 11 is formed between the step portion between the thin-walled section and the other thick-walled sections and the inward flange portion 4c.

Such a flexural concave portion is obvious or self-evident for the skilled person in the art as shown in JP2000-291669A1, JP H06-87724, JP H06-1849 and JP H07-83226; thus, no new matter is added by this amendment.

Moreover, it is clearly depicted in Figs. 1 and 2 that the angle θ of the inside surface 10b of the one inward flange portion 4c which has this flexural concave section 11 with respect to the virtual plane α is larger than the angle θ of the inside surface 10a which has no flexural concave

portion with respect to the virtual plane α . As noted above, this matter is described in the drawings originally filed.

The presently claimed invention has a structure that brings an effect other than those described in the specification, where the damage such as cracking in the continuous portion can be prevented from occurring. For the inward flange portion 4c which has a flexural concave portion defining a portion to be bent at the base end portion thereof, it is more difficult to secure the accuracy of the angle θ of the inside surface 10b than that of the inside surface 10a of the inward flange portion 4b without flexural concave portion which is formed by deep drawing. When this inward flange portion 10b is bent, the angle θ of the inside surface 10b of the inward flange portion 4c is easy to move, according to the magnitude of the force applied to the inward flange portion 4c, in the direction of the above force, i.e., the direction where the angle θ becomes reduced.

In the presently claimed invention, by making the angle θ of the inside surface 10b of the inward flange portion 4c, which has a flexural concave portion 11, greater than the inward flange portion 4b, which has no flexural concave portion, the inclination toward the opposite side of the inside surface 10b can be surely prohibited with or without occurrence of declination thereof. Therefore, even if the processing accuracy is not controlled strictly when the inward flange portion 4b is bent, in the final product, the moment load (or bending stress) applied to the continuous portion can be fully suppressed, and therefore the damage such as cracking can be prevented from occurring.

The above feature is not disclosed in or suggested by the cited art and, therefore, the present invention involves the non-obviousness. Accordingly, the Examiner is respectfully requested to withdraw the rejections.

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Respectfully submitted,



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